Mexican Wolf Blue Range Reintroduction Project
Adaptive Management Oversight Committee
Standard Operating Procedure

Title: Chemical Darting
Number: 22.0
File Name: MW SOP 22.Darting.Final.20050430.doc

Purpose: This SOP provides a means by which IFT members become certified to dart animals. It also provides a procedural outline to enhance the probability of safe and effective darting, and provides guidance for determining specific situations when chemical immobilization by darting is the most suitable or preferred alternative. It supersedes relevant sections of the 1998 Mexican Wolf Interagency Management Plan (USFWS 1998), and therefore represents, in part, the "Service Approved Management Plan" referenced in the Mexican Wolf Final Rule (50 CFR 17.84(k)).

Exceptions: None. Per SOP 2.0, AMOC must approve any exceptions to this SOP.

Background: Chemical immobilization by use of a remote drug delivery system (dart) can be the most effective and/or only means of capturing or restraining a Mexican wolf. However, extreme caution and forethought must be used to ensure the safety of the animal and personnel involved in or near the activity. In addition to the knowledge and training required to safely use chemical agents and firearms, the operator must be aware of the added potential risks of:

1. Physical damage associated with the location of dart impact on the animal;
2. Physical impact damage due to velocity of the dart; and
3. Loss of control of the dart between firing and impact from deflection by wind or vegetation, target animal motion, and firearm inconsistencies, etc.

Procedures:

1. Certification: Each cooperating agency will certify its own employees to use darts for control or routine capture of Mexican wolves. However, any personnel using USFWS-supplied chemicals or acting pursuant to the USFWS permit for such activities must be approved/certified by the Mexican Wolf Recovery Program veterinarian for use of the chemicals (see SOP 20.0).

2. The decision to dart a Mexican wolf should be approached by assessing the activity from broad-to-narrow categorical perspectives, which weigh potential risks against potential benefits. The assessment may vary with the particular situation or individual operator, but, due to the inherent risks of darting, the determination to dart a wolf should result from a progression of positive responses to the following questions:
   a. Does the animal need to be immobilized? For what purpose? Do the benefits outweigh the risks? Is chemical immobilization necessary? What alternative(s) might be more effective (e.g. physical restraint, traps, or abort the activity)?

b. Is a dart the best delivery method? What alternative(s) might be more effective (e.g. hand inject or jab-stick if a captive or trapped wolf)?
c. Is the current situation and time the best to chemically immobilize the wolf by darting? Does it need to be immobilized now? At this location? Consider the timing alternatives that will result in less risk and the same or additional benefits (e.g. better weather, daylight, more conducive property ownership or terrain). If you dart an un-collared Mexican wolf, will you be able to track it until it is immobilized? Darted wolves often find standing water and may go down with their muzzles submerged. The wolf may need to be immobilized or captured again soon for another reason. Perhaps it would be better to wait. Might the darting influence breeding/den season, etc.? Are other people present? What is their experience level and temperament?
d. Are you fully prepared with the equipment, time and experience to conduct the activity safely and completely? IFT members shall not operate a darting apparatus that they are not familiar with. Careful preparation and practice is essential when considering using darting equipment. Review the previous questions and general reasoning; including any other information or circumstances that could possibly affect the situation. Remember, you are considering using drugs. You are completely responsible for the safety of yourself, the wolf, and any other person or animal that might be involved.

3. Steps toward a safe and effective darting event.
   a. Preparation:
      i. Projector accuracy:
         (1) It is your responsibility to be thoroughly familiar with the darting device you intend to use. Practice with the dart equipment throughout the year. Test fire the dart equipment before using it on a wolf. Be accurate at the ranges and with the target size of the animal you intend to dart, or consider an alternate method. You must be able to balance accuracy at a particular range with minimal velocity. The trajectory of a safely fired dart should be a gentle arc, with impact occurring after the apex, when the force of the impact is decreasing.
         (2) Read all manuals before using darting devices. There are a variety of dart types and sizes, projection systems (rifles, pistols, blowguns, etc.) and propellants (powder charges, compressed CO_2 cartridges, compressed air, etc.). Two individual darting devices of the same model can vary in performance. Propellants can vary with age, temperature, and humidity. Try to maintain consistency with the darting device by using one size of dart. If you use powder charges, then use the same box and power level of charges that you practice with (if possible, weigh charges with a gram scale to ensure consistent powder load), and clean the barrel at regular intervals. For pneumatic projectors without a pressure gauge, insert a new cartridge and dry fire three or four times until a full and consistent power level is attained.
      ii. Dart and drug selection:
         (1) Minimizing the impact trauma to the darted animal is a high priority. One might think that a smaller, lighter projectile will inflict less damage than a heavier one, but this is not necessarily true. A lighter dart fired at a higher velocity can cause more trauma than a heavier dart. A lighter dart may allow for accuracy at a longer range and/or use of a less powerful charge (with the

exception of windy or rainy conditions or through vegetation -- refer to "decision to dart" Step 1).

(2) A barbed or collared dart is strongly recommended to prevent popping out at impact and to ensure drug injection. Accordingly, select a drug that allows you to fully dose the animal with the smallest volume of drug. Keep in mind that a free-ranging animal might require significantly higher dosages of drug than the same animal in a different situation. Recommended Drug: re-constituted Telazol at about 5mg/lb of body weight (see SOP 21.0, Appendix B) for drug doses). Mexican wolves are thin-skinned and carry little or no sub-dermal fat. Recommended dart: a three-milliliter dart with a 12 millimeter / 0.5 inch needle with a short barb.

(3) Transmitter darts are available for use on free-ranging animals not fitted with telemetry collars or implants.

(4) Avoid darting altogether if only a standard dart is available for a non-transmitter free-ranging animal.

(5) It is feasible to dart an un-collared wolf if there is snow on the ground or a helicopter is available and you are sure you can track the animal after it is darted.

iii. Final equipment preparation:

(1) Projector – Treat all dart guns as you would any other firearm; that is, treat them as if they were always loaded. As with any firearm, do not load a powder-charge into the projector until at or near the site. Gas cartridge projectors are often stored with a compression charge to maintain seals (check manufacturer's recommendations); but the pressure should be tested prior to darting.

(2) Dart – Protective gear (safety goggles and latex gloves) should be worn when loading drug into the dart. Follow manufacturer's directions when loading darts. Avoid loading the drug into a dart or the dart into the darting device until at or near the site. Extensive jostling and temperature changes can cause the drug to leak from the dart. Do not leave loaded darts on the dash-board of a vehicle. Also, it is extremely hazardous to move around extensively with a loaded dart in your pocket or in the chamber. If it is necessary to pre-load drug into a dart, or move around after drug is loaded; the dart should be transported in a protective container (plastic or aluminum cigar tubes work well for this). Mark the location of the barb on the outer surface of the dart with a sharpie marker to aid in later dart removal.

(3) Other – All necessary animal restraint and handling equipment, as well as appropriate human and veterinary first-aid supplies, must be on hand and readily available prior to darting activity.

b. Targeting: The safest area for a dart to strike on the body of a wolf is the central area of fleshy large muscles of the hindquarters. The front shoulders can be used, but the margin for error is greatly decreased. A dart striking the animal in any other area is risking severe injury or death (e.g. chipped bone, nerve damage, punctured organs, etc.). Care and effort should be taken to ensure that the strike angle of the dart be as close as possible to a line perpendicular to the long axis surface of the animal's body. A dart fired at a sharp angle to the long axis may glance off without penetration, and risks

greater inaccuracy and potential injury. Shots at or approaching a line parallel to the long axis of the animal's body should be avoided. Shots at a moving animal should also be avoided. If a moving animal shot is an absolute necessity, the hindquarters should be targeted. Of course, darting from a helicopter will most likely involve shooting at a moving target. This way an error will more likely miss the animal altogether, as opposed to striking the abdomen or head due to over-leading or the animal suddenly stopping or slowing its motion.

c. Injection determination: Try to keep the dart in view at all times. If it strikes the animal's body and remains in the skin, it is likely that the drug was fully or partially injected. If it strikes the animal and bounces or glances off, it may have partially or fully injected, or not injected at all. If you see the dart bounce off and the animal has moved away, retrieve the dart and inspect it to see if the drug has been expelled from the dart. If the dart is empty, unless you actually saw the drug expelled in the air or on some other object after bouncing off the animal, respond as though the drug injected in the animal. If the animal is still visible, remain still and try to observe it for signs of the drug's effect. Use landmarks, mental imagery, and/or any other means to find and retrieve the dart later.

d. Positive injection response: Most animals shot at, and especially those hit with a dart, will run off. Try to observe the animal without disturbing it. The physical and physiological response activity of a free-ranging wolf following darting can result in a great reduction of the drug's effectiveness. Additional disturbance may further decrease the chances for full immobilization. Allow the animal to feel as though it has escaped the immediate danger of your presence. Usually it will slow its activity/metabolism and allow the drug to take effect. If it is not observable, continue at all times to monitor its movements and activity through telemetry. Stay close enough to respond when it does go down. Use binoculars to observe the animal from a greater distance. Unless you can be certain through telemetry that the animal is still active, obtain a visual within ten minutes of the darting, and within five minutes of telemetric inactivity. Be aware of its direction of travel with regard to aspects of the area (roads, streams, human activity, etc.), which may pose increased hazards to the animal's health. You may need to increase frequency of observations based on potential hazards to the wolf. If the wolf does not slow its travel or activity for 30 minutes, conclude that it has not received any or enough drug for immobilization.

e. Animal retrieval: The animal may be only partially immobilized; be prepared to physically restrain it (you may need a net, but preferably a Y-pole) and/or administer additional drug. Be prepared to immediately assess the animal's vital signs and to respond to hypo- or hyperthermia, shock and injuries (keep on hand: thermometer, ice packs, heat packs, minimal first-aid supplies, etc.). Refer to SOP 21.0.

f. Processing: Follow the procedure for immobilization and processing a live Mexican wolf (SOP 21.0). If the dart is still in the animal, remove it carefully by gently pulling it away from the animal's body. If it is securely held to the skin or other tissue by the barb, try rolling it slightly and unhooking the barb while holding the skin slightly away from the body. Use the mark you made on the dart to locate the barb. Do not push the dart in past the normal surface level of the animal's body while attempting to unhook the barb, and do not forcefully jerk the dart out. A small incision (1/8 inch) with a scalpel may be needed to free the barb from the skin. Treat the injection site as you

would a puncture wound. Collared needles can be pulled directly out of the skin. Carefully inspect the injection area for severity of injury. If there is excessive bleeding, or if the dart has struck in any area without fleshy muscle (rib cage, spine, or head), the chances are high that there is significant injury and veterinary attention may be required. Note: Darting is a very stressful and potentially injurious method of capture.

g. Clean-up: Capture darts, whether containing drug or empty, are hazardous materials. Concerted efforts should be made to retrieve all darts and darting materials, with transport and storage in conformance with established procedures. Fired darts that are not re-useable go in Sharps containers. Unused darts can be cleaned for future use:
    i. With gloves and goggles on, position the dart needle up.
    ii. Using a syringe with a needle long enough to touch the bottom of the interior of the dart, insert the syringe needle down into the dart needle until it gently touches bottom.
    iii. Draw the drug into the syringe; tilt the dart to make sure all of the drug is removed.
    iv. Inject the drug back into an appropriate labeled container.
    v. Flush the dart several times with sterile water and let it drain dry.

4. Information Recording.
    a. Successful darting – all information should be recorded on a standard processing data sheet and the original data sheet stored according to procedure described in SOP 21.0. Location of dart impact on the wolf must be recorded on the data sheet.
    b. Unsuccessful darting attempt – significant information that can be of use in future attempts or for other purposes (e.g. wolf behavior, landowner, etc.) should be recorded in a daily log or in other appropriate files.

Approvals:

The Mexican Wolf Blue Range Reintroduction Project Adaptive Management Oversight Committee approved this SOP on November 23, 2004.

References: None